Analysis of Risk Exposures Encountered by Maintenance Technicians

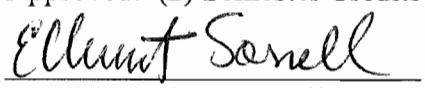
by

Jon Hostasa

A Research Paper
Submitted in Partial Fulfillment of the
Requirements for the
Master of Science Degree
in

Risk Control

Approved: (2) Semester Credits



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ABSTRACT

The purpose of the study was to identify and analyze the daily activities of the maintenance technicians in order to determine the routine exposure to accidental loss. The study focused on routine tasks completed by the technicians. The scope of the study included identifying the technicians' perception of risk associated with the routine tasks and analyzing those tasks to determine the extent of exposure to accidental loss.

A review of literature indicated the perception of risk is related to past personal experiences or experiences by fellow employees. The review also indicated that the Job Hazard Analysis technique is a viable option to identify hazards encountered by the technicians. A written survey was distributed to the technicians and asked them to rank a list of routine tasks and associated hazards based on their perception of risk when completing that task. The tasks with the highest perception of risk were then analyzed using the Job Hazard Analysis technique. The company's standard operating procedures

and maintenance technician job description were also analyzed during this study to determine if the content was applicable.

The results of the survey indicated that the tasks with the highest perception of risk were also tasks that technicians have been injured while completing in recent years. The results of the Job Hazard Analysis of the tasks identified that the technicians are exposed to numerous hazards with varying degrees of severity and probability. Also, it was identified that the company currently does not have or use standard operating procedures for any tasks and the current job descriptions do not indicate any of the hazards that the technicians may encounter in their daily routine. Several recommendations were developed based on the data received from the surveys, the results of the Job Hazard Analysis performed on the task and the review of the standard operating procedures and job description.

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Chapter I: Introduction

Speedway SuperAmerica (SSA) convenience stores sell the standard items that most stores across the country sell: gas and diesel, food and beverages, cigarettes and beer, and car washes. SSA is different from other chains in the fact that all of the maintenance for these items is performed by approximately 120 full-time maintenance technicians. Company-wide, the technicians complete nearly 250,000 work orders on a yearly basis. The technicians are called upon to repair fuel dispensers, underground storage tank equipment, fountain machines, car washes, restrooms, and lights.

Because they make up the majority of the total company employee count, the current safety program at SSA is primarily directed towards the store employees. The technicians complete the same computer-based safety training (CBT) topics as the store employees; however, many of the risks encountered by a maintenance technician are different than what a store employee might experience. There has been a concerted effort to increase awareness and overall safety company-wide, but to date; those efforts are primarily focused on the store employees.

The technicians are exposed to a variety of risk factors when completing their daily tasks. Driving to the store, chemical and electrical hazards, heavy lifting, ladder use and working around customer traffic are the main risks routinely encountered. However, when asked about the potential risks encountered while completing a task, generally, the technician cannot provide an example. The technicians' daily activities are such that the potential risks that they encounter are just accepted as part of the job.

Statement of the Problem

The current employee safety program at SSA requires an analysis to determine if the risk exposures encountered by the maintenance technicians are adequately addressed.

Purpose of the Study

The purpose of the study is to identify and analyze the daily activities of the maintenance technicians in order to determine the routine exposure to accidental loss.

Goals. The goals of the study are the following:

- Survey technicians to understand their perspective on the existing safety program and rank what they perceive to be the most dangerous tasks of their daily activities.
- Thoroughly analyze highest ranking tasks using the Job Hazard Analysis (JHA) technique to identify risk exposures experienced by the technicians.
- Develop a standard operating procedure that identifies risk exposures and necessary steps to reduce potential for loss.
- Update the existing Maintenance Technician job description to include the risk exposures that can be expected to be encountered during daily activities.

Assumptions of the Study

It is assumed that the risk exposures experienced by the maintenance technicians in the Minnesota/Wisconsin Division are the same throughout the company.

Definitions

Job Hazard Analysis - The Job Hazard Analysis (JHA) is a tool that identifies and corrects all the hazards encountered by the techs that could result in accidents, illnesses, injuries, and reduced quality and production (Friend and Kohn, 2007).

Limitations of the Study

The technicians respond to numerous work orders for various reasons. It is unlikely that while completing this study all of the possible variations of work orders were analyzed using a JHA.

Summary

Although the work may not be completed at the same location each time, for the most part, the work completed each week is the same. With that being said, the work that is being completed does expose the technicians to some factor of risk. Because the work is routine there is an opportunity for the technicians to become complacent and lose focus of the risks surrounding them. By analyzing the daily activities using the Job Hazard Analysis technique, the risks encountered by the technicians can be identified and the company can make the decision on how to handle those risks in the future.

Chapter II: Literature Review

The purpose of the study was to identify and analyze the daily activities of the maintenance technicians at SSA in order to determine the routine exposure to accidental loss. The literature review provides support for the goals of the study, which are the following: Current Maintenance Technician Safety Issues, Maintenance Technicians' Perception of Risk, Job Hazard Analysis Technique, Developing Standard Operating Procedures, and Utilizing Job Descriptions for Hazard Awareness.

Safety of Maintenance Technicians

When considering the safety of maintenance technicians in today's environment, it is fair to say that controlling or even identifying all possible risks would be a daunting task. According to Main (2004), the complexity of maintenance tasks and the hazards associated with the work make risk reduction challenging. The technicians are exposed to a variety of conditions (hazards) both manmade and naturally occurring that present potentials for loss; attempting to control these conditions is the goal of any safety program. As Ericson (2005) states, it is generally not possible to eliminate all hazards at work, but it is feasible to develop a system that creates acceptable risk.

In a typical manufacturing operation, the employees complete similar task or work with a piece of equipment in the same manner every day. Identifying hazards and developing a strong safety program in this type of environment, when compared to a maintenance program, is less difficult and time consuming because of the consistency. Maintenance tasks often require observation and testing of equipment in order to effectively diagnose the problems and, in many cases, the hazards potentially encountered cannot be fully identified until the tasks are underway, thus making risk

assessment an ongoing process while completing the task (Main, 2004). According to Main (2004), there are many safety tools available in the industry, but very few are well suited to maintenance activities. One tool discussed by Main (2004) is a risk assessment flow chart specifically developed for maintenance technicians. The flow chart is comprised of three filters that provide maintenance technicians with a simple method to identify tasks that require more extensive risk assessment from those that do not. The filters are described as the following:

First Filter – is the maintenance technician trained to complete the task?

Second Filter – have the hazards been identified?

Third Filter – is the work considered high risk?

How the technician answers each question determines whether the task should be attempted or if more assessment is necessary.

A major factor in the challenge to develop an adequate safety program for a maintenance department is the dynamic daily routine of the technicians. For a maintenance technician, their work days are never the same. The tasks they complete maybe similar in nature, but the location, conditions and intensity of the tasks is generally very dynamic. According to Swartz (2001), maintenance departments usually have the most extensive listing of jobs. The employees generally work independent of others and in conditions not experienced by other employees. This situation requires the technicians to continually assess risk during any task they are performing. According to Main (2004), maintenance personnel make subjective risk assessments every day. When maintenance workers identify a hazard and its potential for harm, and estimate the likelihood that they will be injured from the hazard, they have made a risk assessment. By continually

developing that skill through additional training and with job tenure, the technician can become efficient and accurate in assessing risk. A study conducted in 2003 by Main, Cloutier, Manuele, and Bloswick to examine the constraints and applications of risk assessment to maintenance work resulted in the following:

1. The survey identified shortcomings in current hazard analysis and risk assessment methods as applied to maintenance activities and the knowledge maintenance personnel have of these methods.

2. The results indicate that maintenance personnel widely recognized the need for better equipment and facility designs to accommodate maintenance work.

3. Maintenance workers need, and are asking for, more and better training, including training on risk assessment.

4. A key challenge in risk assessment for maintenance applications involves helping engineers and manufacturers to create new designs that better accommodate maintenance work. Manufacturers and engineers play a very important role in risk assessment, particularly for new equipment designs. Yet engineers often have little knowledge of maintenance tasks or conditions.

5. A second challenge involves assessing maintenance risks on existing equipment. Maintenance workers need to be involved in this activity because they face the legacy of past hazards and risks of designs on a daily basis.

6. Maintenance personnel need a straightforward and quick method to identify hazards and assess risks on existing equipment.

The routine exposure for loss experienced by a maintenance technician provides a great opportunity for risk reduction. Swartz (2001) states that injuries usually occur unexpectedly during a process that is familiar to the technician. The technician, for the most part, knows the risks that are encountered during their daily tasks and they make the decision to continue with an approach that either eliminates/reduces the potential for risk or they chose to ignore the risk. The technicians are always making a trade-off between accepting the risk associated with a task and altering their technique to alleviate the risk (Ericson, 2005). Improving the knowledge, skills and

abilities of the technician to identify hazards and assess risk not only reduces their potential for injury and loss, but also, increases their efficiency and task completion rates.

Perception of Risk

The perception of risk varies among the maintenance technicians. More experienced technicians may be accustomed to the hazards of the job and just accept them, where as, less experienced technicians may be more cautious of the hazards. Swartz (2001) indicates that there can be many different reasons that workers do not perceive hazards associated with the job. The worker may have accepted a condition and thus no longer feel that it is dangerous. Or, they may have never noticed the situation in the first place. Or, they might realize that indicating the hazard could mean that they would have to change their method of doing the job or cause them to have to wear additional protective equipment. Whatever the case may be, there is a discrepancy of risk perception among workers and identifying the overall perception of risk can be difficult.

This discrepancy of risk perception among workers was researched by Argentero, Leiter, and Zanaletti in the Italian printing industry in 2009. Their research indicated that the two most important variables that led to discrepancies in risk perception are the level of familiarity and experience with the tasks performed and the level of knowledge of the safety behavior to be used in potentially dangerous activities. The research also states that people determine riskiness on the basis of a hazard's prevalence, its capacity to inflict harm, and confidence in their capacity to control their interaction with the hazard. Providing the worker with knowledge and tools, such as the Job Hazard Analysis, can increase their awareness and perception of risk and ideally reduce their exposure to accidental loss.

Risk perception can also be altered by past experiences with hazards that may have resulted in an injury. Argentero, Leiter, and Zanaletti (2009) state that workers with a past injury tend to overestimate the severity of the risk. The injury actually sensitizes the worker and they tend to show more severe perceptions of risks combined with a lower sense of control over those hazards. The opposite can be said about workers that never experience an injury – lower perception of risk combined with a higher sense of control over the hazards. David Mclain's (1995) research indicates that workers regularly exposed to health and safety threats interpret the risk in a variety of ways, and these interpretations have implications for job satisfaction, stress, and task performance.

Reasons why some workers follow safety procedures and why some do not are indirectly related to risk perception. One reason workers do not follow safety procedures is a belief that they [safety procedures] reflect an ideal type of safety rather than real-life experience (Argentero, Leiter, & Zanaletti, 2009). This can mean that the workers either perceive the risks associated with the tasks do not warrant safety procedures, or the safety procedures do not adequately address the perceived risks. In either case, without workers' confidence, procedures fail to provide workers with a sense of control. The sense of control over the hazards is one of three factors that influence the probability of employees performing the task using safe behavior – the other two are the presence of perception of risk and the beliefs about the severity of the consequences (Argentero, Leiter, & Zanaletti, 2009).

An employee's perception of risk can be increased by developing and implementing a strong safety program. Argentero, Leiter, and Zanaletti's research (2009) indicates that workers who receive adequate training on safety procedures feel more

comfortable to address the hazards that they encounter. The safety program has improved their perception of risk and also giving them the ability to assess and manage the risk. Employee trust in the organization as a source of risk management is also an important influence of risk perception (Mclain, 1995). By developing a strong safety program, identifying hazards associated with expected tasks and controlling those hazards, the organization can reassure the employees that the company is dedicated to the health and safety of the employees.

Job Hazard Analysis Technique

The maintenance technicians perform a variety of tasks in which they are exposed to many different hazards. It is a fair to say that the majority of the techs understand the "critical" or "life-threatening" hazards that occur while on the job, such as, volatility of gasoline vapors, working on the parking lots exposes them to customer traffic, and the majority of the equipment is operated using 220v electric and eliminating the power source prior to performing a task is crucial. However, it is also fair to say that the majority of the techs do not know *all* of the hazards, for example, improper lifting, chemical exposures, numerous ergonomic hazards, and the hazards associated with not properly performing lock out tag out procedures. The hazards that are over-looked on a routine basis expose the techs to potentially just as severe risks as the more obvious hazards.

In today's environment, employees are asked to work at top speed with high quality and efficiency and also not get injured during the process. According to Bird and Germain (1992), there is enormous pressure to reduce costs while at the same time improving quality and maintaining a safe workplace. The single most useful tool to meet these objectives is to systematically analyze the work which is done and to establish procedures or practices to ensure

that it is consistently done in the correct manner. It is important to analyze the work from the perspective of safety, quality and efficiency all at the same time. Without such an integrated approach, changes might be made for the sake of production or quality which could have a negative impact on the safety and health aspects (Bird & Germain, 1992).

The Job Hazard Analysis (JHA) technique is often used to identify the hazards of a job or task because of its simplistic and productive approach. According to Swartz (2001), the JHA provides "for the systematic identification, evaluation, and prevention or control of general workplace hazards, specific job hazards, and potential hazards which may arise from foreseeable conditions." The goal of the JHA is to identify the hazards encountered by the workers because when hazards are identified and understood, they can be properly eliminated or reduced to an acceptable level (Ericson, 2005). Because the JHA is primarily focused on the safety and health of the workers, other objectives of the company, such as, efficiency and quality are ignored (Bird & Germain, 1992). In an effort to improve the task in its entirety, while performing the JHA on a task, all objectives of the company should be analyzed for potential improvement.

The JHA is a simple process that can be incorporated at any level within a company. The JHA is based on the following ideas:

- A job can be analyzed for hazards in a methodical way.
- A specific job or task can be separated into a series of relatively simple steps.
- Hazards associated with each step can be identified.
- Solutions can be developed to control each hazard (J.J. Keller & Associates, 1996).

The JHA is a program that helps to educate the supervisor and worker while their job is being analyzed for hazards (Swartz, 2001). According to Swartz (2001), the JHA process allows workers to participate in the development of processes, offer their knowledge on how to perform

a certain task, and identify the associated hazards. This idea of providing the workers that are directly affected by the results of the JHA an opportunity to assist in the development of the safety program is crucial. The worker has the best familiarity with the job and the exact steps, procedures, and hazards that are associated with the job. Also, incorporating the worker avoids any feeling of being "made an example of" when they are observed performing a process (J.J. Keller & Associates, 1996). Finally, employees are more likely to follow procedures if they have a voice in the development of the procedures (Friend and Kohn, 2007). Once the process is approved by management and the employees understand their involvement, the initial step is to develop a list of jobs that will be analyzed incorporating the JHA technique.

Job analysis. One of the most important steps to the JHA is producing a job list. The job list compiles all of the jobs in the manufacturing plant or job site that have some form of danger or safety hazard involved in the task (Swartz, 2001). According to Swartz (2001), the job list puts the JHA into motion by giving it direction. Without a complete list of jobs, the process would be difficult to organize. Each of the jobs to be analyzed must be assigned a name and number or letter identification so they can be organized and easily retrieved for future use. Swartz (2001) also indicates that maintenance departments usually have the most extensive listings of jobs. The maintenance workers are exposed to the hazards of the entire facility because of their involvement in every aspect of the facility. With that being said, the analysis of the jobs on the list should be ranked based on perceived risk or, if the information is available, based on the history of the job causing the most serious injuries or fatality. The job list provides supervisors and managers a dynamic list that can be altered to meet the current needs of the company and ensure that the JHA process is being completed.

According to Simpson (1998), a job analysis is a systematic study of a job by identifying

the elements and tasks to determine any of the following: required skills and training, physical demands, temperaments, environmental conditions, and hazards involved. A job analysis involves observing the job and interviewing the performing employee to identify the logical order of the job. The job can then be broken down into routine and non-routine job functions. Routine job functions can include machine operation, material handling and housekeeping items. Non-routine job functions can and may include emergencies and breakdowns (U.S. Department of Labor, 1991).

Job analysis can be performed planned or unplanned by the reviewer. During an unplanned analysis the reviewer will likely see more exposures to hazards because the employee will be performing the job at a higher speed and likely incorporating any "short cuts" they may use (Swartz, 2001). During a planned analysis the reviewer has more of an opportunity to discuss each task of the process with the employee and better understand why the employee is performing the task in a certain manner. Both situations provide the reviewer an opportunity to see each task performed and write down any potential hazards that may be encountered. Once the job analysis is complete, the reviewer can then proceed to the task analysis step and thoroughly investigate each individual task for hazards and solutions to those hazards.

Task analysis and hazard recognition. Upon completion of the job analysis, the next important step in the JHA is task analysis and hazard recognition. The purpose of the JHA is to identify hazardous conditions encountered while performing a job. For the job to be thoroughly analyzed, every aspect of the each task, including safety, quality and production, should be considered (Bird & Germain, 1992). Each task of that job must be analyzed to be made safer and more efficient (Friend and Kohn, 2007). The difficulty with injury prevention and ensuring employee safety is identifying exactly how the injury is occurring and what aspect of the task is

allowing it to occur. It is unlikely that the injury or unsafe conditions are solely a result of the employee's actions; many times it is a culmination of items (Swartz, 2001). Through task analysis, the reviewer is giving the opportunity to identify the causes of the unsafe conditions and what can be done to reduce or eliminate them.

Task analysis is defined as the study of what an operator or team of operators is required to do, in terms of actions and/or cognitive processes, to achieve a system goal (Simpson, 1998). During this study of the individual steps and processes of a job, the reviewer and employee are able to recognize hazards that are encountered in each step. Often times, the employer has already identified the most extreme hazard that could be encountered by the employee performing the job; however, through task analysis, the not so critical hazards are identified. These "lesser" hazards, many times, are the culprit for causing the most extreme hazards (Swartz, 2001). Managing all hazards encountered in a job process is a key component to a safe work environment.

The recognition of hazards during the task analysis process is the most critical component of the JHA. Ericson (2005) states that safety revolves around hazards; therefore, hazard identification and elimination and control are the keys to the JHA process. Hazards are predictable, and what can be predicted can also be eliminated or controlled. In order to recognize or identify hazards, Ericson (2005) list four necessary attributes:

1. An understanding of hazard theory;
2. A hazard analysis technique to provide a consistent and methodical process;
3. An understanding of hazard recognition methods; and
4. An understanding of the system design and operation.

Hazards can be recognized using a variety of techniques. The individual performing the task analysis can incorporate these techniques during the process. The techniques used in hazard recognition are identified by Ericson (2005) as the following:

- Hazards can be recognized by focusing on tasks that are known to trigger hazards.
- Hazards can be recognized by focusing on known or pre-established undesired outcomes.
- Hazards can be recognized through the use of past knowledge from experience and lessons learned.
- Hazards can be recognized through review and analysis of good design practices.
- Hazards can be recognized through the review of general design safety criteria and principles.
- Hazards can be recognized through the use of key questions asked to the worker. This is a method involving a set of clue questions that must be answered, each of which can trigger the recognition of a hazard. For example, "What happens when the switch fails to operate?" may lead to the recognition of a hazard.

During the process of hazard recognition, it is very important to correctly describe the hazard. According to Ericson (2005), the hazard description must contain the source, mechanism and outcome. The description should also be clear, concise, descriptive and to the point. Swartz (2001) provides the following list of sources of injuries that the individual completing the JHA should use when identifying the hazards associated with a task:

- **Struck-By (SB)** – an injury in which a person is struck by an object of some kind.
- **Struck-Against (SA)** – one in which the worker unexpectedly and forcefully makes contact with something in the worker's environment.
- **Caught-Between (CB)** – pinch point hazards.

- **Contact With (CW)** – involve someone making contact with something hot, a chemical, or electricity.
- **Contacted By (CBy)** – worker is somehow forced by other means into contact with the object. Injury must be caused by the injurious characteristics of the contacting agent and not the force of the contact.
- **Caught On (CO)** – worker having a part of his clothing, working attire, or body caught on a moving or stationary object.
- **Caught-In (CI)** – involves the person or a part of the person's body being caught in an enclosure or hole of some kind.
- **Fall Same Level (FS)** – falls that occur at the walking level or on stairs and steps.
- **Fall to Below (FB)** – at least one person falls from one level where they have been working, standing, or walking to a lower level.
- **Overexertion (OE)** – incident or injury is one in which a worker is injured by putting too much strain on some part of the body, or his body is used improperly to complete a task.
- **Environmental Exposures (EE)** – exposures involve radiation, fumes, gases, vapors, mists, dusts, temperature extremes, oxygen deficiencies, and noise.

For each identified hazard, a severity of the hazard and a probability that the hazard will occur should be developed. By focusing on the most severe and the most likely to occur, the JHA can identify the tasks and associated hazards to be addressed first. J.J. Keller & Associates (1996) suggests using the severity and probabilities descriptions as used by the U.S. military organizations. They are as follows:

Hazard Severity –

I. **Catastrophic** – may cause death or a complete facility loss.

II. **Critical** – may cause severe injury, severe occupational illness, or major property damage.

III. **Marginal** – may cause minor injury or minor occupational illness resulting in lost workdays, or minor property damage.

IV. **Negligible** – probably would not affect personnel safety or health and thus, less than a lost workday, but nevertheless is in violation of specific criteria.

Hazard Probabilities –

A. Likely to occur immediately or within a short period when exposed to hazard.

B. Probable to occur in time.

C. Possible to occur in time.

D. Unlikely to occur.

Identifying, describing, and assigning a severity and probability to a hazard during the JHA process allows for the development of policies and procedures that eliminate or control the hazard. The final step of the JHA process is to use effective risk control methods to provide solutions to the identified hazards.

Risk control and solutions to hazards. Ericson (2005) states that the basic reasons why hazards exist are two fold: 1 – They are unavoidable because hazardous elements must be used in the completion of the task, and/or 2 – they are the result of inadequate design safety consideration. The JHA technique identifies these hazards through job and task analysis and it is the responsibility of the company to eliminate or control the hazards. Injury investigation and hazard analysis are only half of the corrective actions needed. All of the causes and conditions have to be corrected, not just identified (Swartz, 2001).

As mentioned earlier, hazards are described as having a source, mechanism, and outcome; this is also known as the Hazard Triangle. According to Ericson (2005), by eliminating one side of the triangle, the hazard and its associated risk are also eliminated. The process of eliminating the source, mechanism, and outcome is done through hazard controls. According to Bird and Germain (1992), controls should ensure that the work is performed safely and with maximum efficiency. As mentioned in the ISO 18001 Standards (BSI British Standards, 2007), when determining controls, consideration shall be given to reducing the risks according to the following hierarchy:

a) Elimination;
b) Substitution
c) Engineering controls;
d) Signage/warnings and/or administrative controls; and
e) Personal Protective Equipment (PPE)

The ISO 18002 Standards (BSI British Standards, 2008) provide the following examples of implementing the above mentioned hierarchy of controls:

a) Elimination – modify a design to eliminate the hazard, e.g. introduce mechanical lifting device to eliminate the manual handling hazard;
b) Substitution – substitute a less hazardous material or reduce the system energy;
c) Engineering controls – install ventilation systems, machine guarding, sound enclosures, etc;
d) Signage/warnings and/or administrative controls – safety signs, hazardous area marking, warning sirens/lights, alarms, safety procedures equipment inspections;
e) Personal Protective Equipment – safety glasses, hearing protection, face shields

According to Main (2004), not all potential risk reduction measures are practical and feasible. Many factors determine feasibility or practicality, such as technical, cost, usability and productivity. The options and strategies for treating risk are assessed in terms of:

- Their potential benefits;
- Their effectiveness in reducing losses;
- The cost to implement the option(s);
- The impact of control measures on other stakeholder objectives, including the introduction of new risks or issues (Main, 2004).

The principle of the hierarchy of controls revolves around starting every risk reduction effort at the top of the hierarchy. By using methods to eliminate the hazards by design and working sequentially down through the hierarchy results in a feasible method to reduce risk (Main, 2004). Main (2004) also indicates that this principle discourages jumping to lower controls such as warnings, training or PPE that may cost less or require less engineering time, yet provide less-effective risk reduction when higher-level controls such as engineering systems are feasible.

The JHA technique provides a solid foundation for developing a strong safety program. However, just as the safety program must remain liquid and adapt to any changes in a company's policies and procedures, the JHA must continue to be used to verify new hazards that have not appeared previously. According to Ericson (2005), some of the hazards in a newly designed process or task will escape detection, no matter how aggressive the safety program. The JHA is a long-term program that is constantly being updated and modified. The JHAs that have been completed will be reviewed and updated where necessary to continue to protect the workers (Swartz, 2001).

The JHA technique provides a simple yet effective solution to hazard control in the workplace. According to Swartz (2001), management will discover that increasing the emphasis on correcting and investigating everyday incidents will decrease the frequency of property and product damage, near-hits, unsafe conditions, and unsafe behavior. Proper controlling of hazards and continuous deployment of the JHA technique can lead to a more proactive safety program. In the following sections of this chapter, the use of the JHA technique to assist the safety program by developing job descriptions and standard operating procedures is discussed.

Developing a Standard Operating Procedure

In OSHA's, *Compliance Guidelines and Recommendations for Process Safety Management* (2009), Standard Operating Procedures (SOP) are described as tasks to be performed, data to be recorded, operating conditions to be maintained, samples to be collected, and safety and health precautions to be taken. The SOPs include specific instructions or details on what steps are to be taken or followed including the applicable safety precautions in carrying out the stated procedure. This type of administrative hazard control involves prescribing safe procedures that the worker must follow to protect themselves while performing each step (Keller & Associates, 1996). The JHA is a tool that assists in the development of the SOPs.

During the JHA process, the job has already been divided into individual tasks and assigned specific hazards; based on the severity and probability of the hazards, new procedures can be developed to control or eliminate the hazard. According to Swartz (2001), the JHA is intended to identify dangerous and sometimes inefficient methods and replace them with the proper procedures that reduce the potential for loss. By identifying exactly what the worker should or should not do on the JHA form, a safe work procedure can be established. The JHA form itself can serve as the written SOP (Keller & Associates, 1996).

Bird and Germain (1992) discuss an issue that may arise from developing and strictly enforcing SOPs for every task. They insist that not all tasks can or should be proceduralized. For some tasks, "guidelines" may be more functional and useful. Guidelines are used on tasks, such as, using a chain saw, entering confined spaces, and locking out equipment. These types of tasks are not done in the same manner every single time because the conditions in which they are performed changes. The guidelines provide an overview of how to properly and safely complete the task in any condition. Bird and Germain (1992) suggest the following areas of emphasis when developing guidelines:

A. **Motivation** – explain why the worker should comply with the standard practice.
B. **Special Problem Sources** – point out the most probable sources of problems for the specific task.
C. **PPE** – specify required PPE necessary for the performance of the task, the conditions under which it is required and the reasons for its use.
D. **Special Devices and Equipment** – emphasize proper use of special guards, barriers, switches, locks and emergency equipment when performing the task.
E. **Emergency Procedures** – refer to the procedures for cases of fire, explosion, flooding and other catastrophes. Specify emergency first aid equipment, emergency shutdown procedures and reporting requirements which apply particularly for the task.
F. **Critical Rules and Regulations** – reinforce the most important rules by including them in the work practices.
G. **Positive, Proper Practices** – highlight the things that worker can do to ensure efficient, safe, productive results.

H. Summary Statement – summarize the most important points. Zero in on the benefits of proper performance.

Simply writing the SOPs or guidelines does not result in a safer work environment. Complete management support is critical for the SOPs and guidelines to assist in the control of workplace hazards. According to Swartz (2001), ensuring that safe and correct procedures are being followed enhances workplace quality and efforts. If management is not consistent with their message and continually enforcing the program, the new procedures will fail. As the workers see that the company is serious about the changes, they will support the program. One technique to reiterate that the company is serious about controlling hazards and make their workers aware of any potential hazards is to incorporate the language into the employee job descriptions.

Utilizing Job Descriptions

An accurate job description plays an important role in the hiring of quality employees. It is also a technique that companies can use to continually improve their safety programs. The job description is the very first exposure the applicant has to the company and by detailing the potential hazards of the job and the importance of practicing sound risk control techniques, the applicant is aware of the company's position on safety. According to Rhodes and Rhodes (2002), not only can a job description help to prevent accidents by ensuring that an applicant is qualified for that job, it also helps to prevent misunderstanding about job expectations.

In general, a job description indicates specific tasks, duties and responsibilities and, as Rhodes and Rhodes (2002) indicate, should include the following components:

- Required knowledge, skills and abilities;
- Education and experience;

- Physical requirements; and
- Working conditions.

Exposing the applicant to the demands of the job reduces liability on the company because the applicant is indicating that he/she understands the demands and is capable of completing the job. Again, because the JHA already outlines the steps and hazards associated with the job, it can be the job description or a part of the job description (J.J. Keller & Associates, 1996). The applicant can read every step of a task and gain a respect for the conditions and hazards that are involved with the task. This can also lead to a discussion between the interviewer and the applicant about how the company controls the hazards on the job and how the employees are incorporated in the program.

Knowing that employees perceive risk in different ways, during the interview process an applicant's attitude toward safety should be gauged, especially when reading the job descriptions (Rhodes and Rhodes, 2002). The types of questions and statements used by the applicant regarding safety and risk control can foreshadow the type of employee being interviewed. A written job description allows the interviewer to focus questions on key job functions, and ensures that each applicant receives the same information about the company and the job (Rhodes and Rhodes, 2002). If a company uses numerous interviewers, the written job description provides a consistent message about the position and reduces confusion in the future.

It is vital that companies recognize that hiring practices, specifically selection and placement, are an important part of the effort to control hazards and accident-related costs (Rhodes and Rhodes, 2002). The written job description is the initial step in the hiring practice. By utilizing the JHA to develop sound job descriptions, a company is delivering the message that safety and hazard control are a priority and this mentality starts on day one. The following

chapter discusses the methodology used in this research to gather information regarding risk perception and hazard control by using surveys and the JHA technique.

Chapter III: Methodology

The purpose of the study was to identify and analyze the daily activities of the maintenance technicians in order to determine the routine exposure to accidental loss. The goals of the study are the following:

- Survey technicians to understand their perspective on the existing safety program and rank what they perceive to be the most dangerous tasks of their daily activities.
- Thoroughly analyze highest ranking tasks using the Job Hazard Analysis (JHA) technique to identify risk exposures experienced by the technicians.
- Develop a standard operating procedure that identifies risk exposures and necessary steps to reduce potential for loss.
- Update the existing Maintenance Technician job description to include the risk exposures that can be expected to be encountered during daily activities.

The following methodology outlines the data required and the methods used to gather information for the analysis.

Data Required

The 15 maintenance technicians that perform work in the Minnesota and Wisconsin operating markets completed a risk perception survey on 12 tasks routinely completed during their day. Each task also identified a potential hazard to which the technicians are exposed while completing the task. The technicians assigned a ranking of each task based on their perception of risk involved with completing that task and its associated hazard. The range for the ranking system was 1 (highest perceived risk) to 12 (lowest perceived risk). A copy of the survey used is attached as Appendix A.

Upon completion of all surveys, the data was compiled to determine which five tasks to analyze using the JHA. The rankings for each task were totaled and then re-ranked in ascending order; the five tasks with the lowest total score were chosen for the JHA. The following methods were used to complete the JHA of the chosen five tasks.

Data Collection Methods

Due to the maintenance technicians performing a large variety of tasks on a daily basis, reducing the analysis to the 12 routine tasks was required. In order to properly analyze the chosen tasks, a Job Hazard Analysis form was designed. The form identifies the job title, description of the job, location where the work is performed, date and time, priority of the work (SSA uses their own priority ranking system for work orders), the person performing the work and the person performing the analysis. A copy of the forms is attached as Appendix B-1 and B-2. Below this information is an area to write out the logical steps of the task being completed.

The next step performed was watching the technician perform the task. As the technician worked, the steps were documented on the form. The only questions asked to the technician were in relation to the reviewer not knowing the names of certain tools or parts being used. The technician is supposed to perform the work as he would during a normal call and answering questions about the process is not appropriate during this step.

The third step involved interviewing the technician once the work was complete to verify all the steps are listed. This is an important step to ensure all aspects of the task are analyzed. Once this was complete, the reviewer and the technician went through each step to identify and discuss the hazard codes encountered.

Data Analysis

Once the steps of the tasks are recorded, the reviewer identified any hazards associated with that task and documented them on the Hazard Analysis page. The first column of this page is the Description of the Task section which identifies the step with a hazard identified. Next to that section is the Hazard Code section where the hazard code was documented. A definition of the hazard codes was supplied on the third page of the form. Next to the Hazard Code section is the Severity and Frequency sections. The reviewer determined the severity and frequency of the identified hazard actually occurring using the definitions on the form and documented it in these sections. Based on the severity and frequency ratings, the reviewer used the Risk Assessment Matrix supplied on the fourth page to calculate the risk code for the hazard. The risk code was then documented in the Risk Code section of the form. Finally, the reviewer provided a recommendation in the Recommendation section to control the hazard. An example of the forms is attached as Appendix B-3 and B-4.

Finally, once the five tasks were analyzed using the JHA, the reviewer went over the results and recommendations with the employee and the supervisor to ensure that they understood the recommendations and listened to their feedback. The results of the JHA were then used to develop standard operating procedures or guidelines for the task in an effort to ensure the elimination or reduction of loss exposure each time the task is performed. Also, the hazards identified during the analysis were included in the updated maintenance technician job description to properly inform any new employees of the potential exposures of the job.

Chapter IV: Results

The purpose of the study was to identify and analyze the daily activities of the maintenance technicians in order to determine the routine exposure to accidental loss. The goals of the study that were analyzed are the following:

1. Survey technicians to understand their perspective on the existing safety program and rank what they perceive to be the most dangerous tasks of their daily activities.
2. Thoroughly analyze highest ranking tasks using the Job Hazard Analysis (JHA) technique to identify risk exposures experienced by the technicians.
3. Develop a standard operating procedure that identifies risk exposures and necessary steps to reduce potential for loss.
4. Update the existing Maintenance Technician job description to include the risk exposures that can be expected to be encountered during daily activities.

The following sections describe the results of the study as they pertain to the three goals mentioned above.

Research Goal #1

The 15 maintenance technicians were surveyed to understand their perspective on the existing safety program and rank what they perceive to be the most dangerous tasks of their daily routine. Two questions were asked at the beginning of the survey to understand the tech's perspective on the existing safety program. The first question of the survey was – How well do you understand the current Corporate Safety policies and procedures?

The survey results for question #1 are listed in Table 1.

Table 1

Maintenance tech survey results to question about understanding the current corporate safety policies and procedures

Response	Frequency (n=15)	Percentage
Understand completely	8	53.3%
Sort of understand	7	46.7%
Do not understand	0	0.0%
Did not know there were any	0	0.0%

These results indicate that the majority of the techs (by only one tech) feel that they completely understand the Corporate Safety policies and procedures. Ideally, *all* of the techs should understand the current corporate safety policies and procedures. The technicians' only exposure to the corporate safety policies and procedures is through annual computer-based training.

The second question asked in the survey was – Do you feel that the current Corporate Safety policies and procedures are applicable to your daily routine? The survey results of question #2 are listed in Table 2.

Table 2

Maintenance technician survey results to question about the applicability of the current corporate safety policies and procedures and their daily routine

Response	Frequency (n=15)	Percentage
Completely applicable	10	66.7%

Somewhat applicable	5	33.3%
Not applicable at all	0	0.0%
Did not know there were any	0	0.0%

These results indicate that the majority of the techs feel that the current Corporate Safety policies and procedures are applicable to their daily routine. Many of the techs commented that they know there are safety policies and procedures, but that they [safety policies and procedures] are directed primarily to the operations group of the company. With that being said, many of the techs commented that their job is not dangerous as long as one uses "common sense" while working.

As part of the survey, the technicians also ranked 12 routine tasks that are completed daily. Each task also identified a potential hazard to which the technicians are exposed while completing the task. The technicians assigned a ranking of each task based on their perception of risk involved with completing that task and its associated hazard. The range for the ranking system was 1 (highest perceived risk) to 12 (lowest perceived risk). The rankings for each task were totaled and then re-ranked in ascending order; the five tasks with the lowest total score were chosen for the JHA. The results of the task ranking portion of the survey are listed below in Table 3.

Table 3

Results of totaling the assigned task rankings based on the technicians' risk perception.

Task	Total
Working on submersibles (customer vehicle hazard)	67
Working on submersibles (electrical hazard)	89
Sump inspections (heavy lifting hazard)	89
Changing product filters on dispensers (chemical hazard)	91

Working on security cameras (ladder use)	93
Driving to sites to perform work (driving hazards)	95
Changing hanging hardware on dispensers (chemical hazard)	96
Changing hanging hardware on dispensers (customer vehicle hazard)	97
Changing lights (ladder use)	97
Working on food service equipment (heavy lifting hazard)	100
Working on food service equipment (electrical hazard)	102
Working on UST system (fire hazard)	104

As mentioned in Chapter 2, the perception of risk is often related to personal experiences or knowledge of a co-worker's experiences with a particular risk. The results listed in Table 3 reflect this concept. In recent years, individual technicians have been injured while performing each of the top five tasks by the exact hazard that was listed with the task. One tech was struck by a car while working on a submersible motor. Another tech was severely shocked while working on a submersible motor. Numerous techs have complained of back problems since the inception of the sump inspection requirements. One tech was sprayed in the shoulder and face with gasoline while changing the filters at a dispenser. Finally, a tech fell from a ladder and severely fractured their ankle.

The tasks with the lowest total score are the tasks with the highest perception of risk. The five tasks with the lowest totals were chosen to be further analyzed using the JHA technique. Those tasks are the following:

1. Working on submersible turbine motors (customer vehicle hazard)
2. Working on submersible turbine motors (electrical hazard)
3. Underground storage tanks and dispenser sump inspections (heavy lifting hazard)
4. Changing fuel filters on dispensers (chemical hazard)
5. Working on security cameras (ladder use)

Research Goal #2

In order to identify the technicians' exposure to hazards and accidental loss while performing certain tasks, a JHA was performed on the top five tasks with the highest perceived risk as mentioned above. Because the five tasks are routine daily tasks, the JHA could be completed in real conditions at the store level. Techs were not chosen to complete the tasks, as a tech received a work order to complete one of the five tasks, they called the investigator to set up a time to analyze the task.

JHA results of working on a submersible turbine motor (customer vehicle hazard). This task and associated hazard was ranked by the technicians as having the highest perceived risk. The results of the JHA for this task are listed below in Table 4.

Table 4

Results of JHA performed on working on a submersible motor.

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:
1. Tech barricades work area with maintenance vehicle and three 24 inch cones.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. If the tech can use a store employees vehicle to help barricade the other side of the sump that would be ideal.
5. Tech turns electrical breaker for motor to "off"	CW	I	Probable	1	The tech should use company approved lock out / tag out methods to ensure energy to motor is completely disabled and cannot be turned on by anyone else.
6. Tech removes 36" steel manhole lid with 24" hook tool.	OE	III	Frequent	2	The tech should use proper lifting methods and refrain from "jerking" on the lid as a removal technique. The use of additional tools to create a fulcrum system should be used to reduce stress on the back.
9. Tech enters the sump and disconnects electrical yoke on motor.	CW	I	Probable	1	The tech should use an LEL meter to verify that the levels of hazardous vapors in the sump are acceptable prior to entering the sump.

The results indicate that the technicians' perception of risk associated with being struck by a customer's vehicle is valid. There was an observed hazard of being struck by a vehicle that was assigned a severity of I or catastrophic (results in death) and a frequency of Probable (1-2 year event), thus resulting in a hazard code of 1 (imperative to suppress to lower risk levels). As mentioned above in the table, the risk could be suppressed by incorporating larger barricades with flashing lights or using another vehicle to protect the other side of the work area. A copy of the completed JHA is attached as Appendix C.

JHA results of working on a submersible turbine motor (electrical hazard). This task and associated hazard was ranked as having the second highest perceived risk by the technicians. Because this task is the same as the task mentioned above, only the hazard is different, the results identified in Table 4 apply here also.

The results of the JHA indicate that the technicians are exposed to an electrical hazard with a high degree of risk. As listed in Table 4, the electrical hazard was assigned a severity of I or catastrophic (results in death) and a frequency of Probable (1-2 year event), thus resulting in a hazard code of 1 (imperative to suppress to lower risk levels). To suppress this risk, the technicians should ensure that they completely understand the company's lock out / tag out policies and procedures and use these procedures when working on the motors. A copy of the completed JHA is attached as Appendix C.

JHA results of performing the underground storage tank and dispenser sump inspections (heavy lifting hazard). This task and associated hazard was ranked as the third highest perceived risk by the technicians. The inspections completed by the techs are completed on a monthly basis and each tech performs 5 – 10 inspections per month. The inspections are required by the State

of Minnesota as of 2008 and Wisconsin as of 2009 to identify areas where fuel could be lost to the environment. The results of the JHA are identified below in Table 5.

Table 5

Results of JHA performed on underground storage tank and dispenser sump inspection.

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:
2. Tech places one 24 inch safety cone next to manhole to be inspected.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. If the tech can use a store employees vehicle to help barricade the other side of the sump that would be ideal.
3. Tech uses lifting tool with hook to remove 36" steel manhole lid.	OE	II	Frequent	1	The tech should use proper lifting methods and refrain from "jerking" on the lid as a removal technique. The use of additional tools to create a fulcrum system should be used to reduce stress on the back.
4. Tech uses lifting tool with hook to remove sump containment lid.	OE	II	Frequent	1	The tech should use proper lifting methods and refrain from "jerking" on the lid as a removal technique. The use of additional tools to create a fulcrum system should be used to reduce stress on the back.
8. Tech relocates cone to dispensers to perform dispenser sump inspection.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. The use of the tech's truck as a barricade would be ideal.

The results of the JHA indicate that there is a lifting hazard associated with completing the sump inspections. The lifting hazard was assigned a severity of II or critical (injury or illness causing >$50,000 in damage) and a frequency of Frequent (likely several times a year) which results in a hazard code of 1 (imperative to suppress to lower risk levels). This applies to both removing the 36" manhole lid and removing the sump containment lid. The sump containment lid is made of plastic and is not considered heavy (weighs approximately 15 lbs.), but in order to remove the lid the techs have to use a jerking motion that applies additional strain on the back. In

order to suppress the risk to lower levels, the techs should use tools that create a fulcrum to remove the lids instead of actually lifting the lids. If the tech *has* to lift the lids, they should use proper lifting methods and refrain from using a jerking motion as a method to remove the lid. A copy of the completed JHA is attached as Appendix D.

JHA results of changing fuel filters on a dispenser (chemical hazard). This task and associated hazard was ranked as having the fourth highest perceived risk by the technicians. The techs perform this task at least twice per year on every store and as needed based on fuel flow rates through the dispenser. The results of the JHA are listed below in Table 6.

Table 6

Results of JHA performed on the changing of fuel filters at a dispenser.

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:
2. Tech chooses a dispenser without any customers and places cone in front of dispenser.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. The use of the tech's truck as a barricade would be ideal.
6. Tech uses filter wrench to slowly unthread filter	CW	II	Frequent	1	The tech should don a face shield and protective gloves to ensure that gasoline does not come in contact with their eyes or skin.
13. Tech takes approved container over to the underground storage tank and pours the gasoline back into the tank.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. The use of the tech's truck as a barricade would be ideal.
5. Tech places metal tray under the filter that will be removed in order to collect any gasoline.	CO	IV	Frequent	3	The tech should wear gloves that cover up their elbows or long sleeve apparel to protect their arms from sharp edges.

The results of the JHA indicate that the hazard of coming in contact with a chemical (petroleum) exists. The hazard was assigned a severity of II or critical (injury or illness causing

>$50,000 in damage) and a frequency of Frequent (likely several times a year) which results in a hazard code of 1 (imperative to suppress to lower risk levels). To suppress this risk, the techs should don a face shield and protective gloves that cover up to the elbows to ensure the chemicals do not come in contact with their eyes or skin. A copy of the completed JHA is attached as Appendix E.

JHA results of working on security cameras (ladder use). This task and associated hazard was ranked as the fifth highest perceived risk by the technicians. Each store in the company has, on average, 15 cameras in it to protect the employees and the company from internal and external loss. The techs are required to run the wire through the ceiling and install the cameras (or adjust the cameras) as needed by the Security and Loss Management Department. The majority of the stores have 10 – 12 feet ceilings so all of the work is completed using a ladder. The results of the JHA are listed below in Table 7.

Table 7

Results of JHA on running security camera wire from office to backroom.

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:
4, 6, 9, 11, 13, 19. Tech stands on 1st and 2nd rung from the top of ladder to perform work	FB	II	Probable	1	The tech should use the appropriate equipment for the job. The tech needed an 8 feet and 10 feet ladder in order to reach the heights required.
5. Store employees continually walk past ladder to retrieve items from storage.	SB	II	Probable	1	The tech should discuss with the store employees that the area around the ladder is inaccessible and the employees should retrieve any items they may need prior to setting up the ladder.
15. Customers walk around ladder to get to restrooms.	SB	II	Probable	1	The tech should barricade off the area in which work is being completed to ensure customers cannot strike the ladder.

The results of the JHA indicate that there are numerous steps in the process that expose the technician to accidental loss while on the ladder. Each step has been assigned severity of II or

critical (injury or illness causing >$50,000 in damage) and a frequency of Probable (1 – 2 year event) which results in a hazard code of 1 (imperative to suppress to lower risk levels). Due to the height of the store ceilings, the best way to suppress the risk to lower levels is to ensure that the technicians have the appropriate sized ladder for that store. The technicians should have available to them an 8 and 10 feet ladder for this work. Also, the technician and the ladder are exposed to being struck by employees and customers that may result in them falling from the ladder. The technician should discuss with the store employees to let them know that the area with the ladder is off limits and provide the employees ample time to retrieve items prior to starting work. The technician should also barricade the area around the ladder to prevent customers from entering the work space and potentially striking the ladder. A copy of the completed JHA is attached as Appendix F.

Research Goal #3

Currently, the company does not have standard operating procedures for any tasks that the maintenance technicians perform. Based on the findings from the survey and the JHA, standard operating procedures should be used to assist in the control of the hazards. As mentioned in Chapter 2, SOPs describe the tasks to be performed and how they should be performed to reduce the exposure to accidental loss. The completed JHAs should be used to develop how the tasks are to be performed and the recommendations should be incorporated into the tasks so the severity and/or probability are reduced to an acceptable level. If the tasks are not performed in the same manner every time, standard operating guidelines should be developed instead of standard operating procedures. The guidelines provide an overview of how to properly and safely complete the tasks in any condition. The underground storage tank and dispenser

sump inspection is a task that should have a standard operating guideline because the conditions vary from site-to-site but the overall process is the same.

Research Goal #4

The 2009 maintenance technician job description, see Appendix G, was reviewed to determine if there were any opportunities for improvement based on the risk perception surveys and the results of the JHAs. The results of this review are as follows:

- The job description does not describe any risks to which the technicians may be exposed, such as, chemical and electrical hazards, driving hazards, use of ladders, fire hazards, customer vehicle hazards, and heavy lifting hazards.
- The job description does not discuss the need for the technicians to assess situations from a risk standpoint and be able to identify the potential for accidental loss.
- The job description does not include a requirement that the technicians must comply to all corporate safety policies and procedures.
- The job description does not include language about accurately completing annual safety courses.
- The job description does not discuss the company's philosophy on risk control and the actions taken to ensure employee safety.

The job description is the first opportunity to make a new technician aware of the potential risks to which they will be potentially exposed. By incorporating language into the job description about the risk exposures, the company is taking a step to control the risks early in the process.

Summary

Data for this study was collected by surveying the 15 maintenance technicians in the Minnesota and Wisconsin Divisions. The survey provided insight on the technicians' thoughts about the current corporate safety policies and procedures and their applicability. The survey also documented how the technicians perceive risk while performing certain routine tasks.

The technicians feel that they understand the corporate safety policies and procedures, but that feeling was not overwhelming. Also, most of the technicians indicated that the policies and procedures are applicable to their job, but one-third of the technicians indicated that the policies and procedures only somewhat apply to their job.

The perception of risk appears to be directly linked to the personal experiences and/or knowledge of a co-worker's experience with a particular task. The tasks with the highest perceived risks according to the rankings also happen to be the five tasks that technicians have recently been injured while performing.

The company does not currently have standard operating procedures for any tasks that the maintenance technicians perform. The completed JHAs should be used to assist in the development of the standard operating procedures and standard operating guidelines. These documents, if enforced, can assist in the control of hazards and reduce the exposure to accidental loss.

A review of the current job description identified several opportunities for improvement. Currently, there is no mention of the risk exposures encountered by the technicians or the corporate safety policies and procedures. There is an opportunity for the company to increase risk awareness and risk control earlier in the process by updating the job description.

Chapter V: Summary, Conclusions, and Recommendations

The purpose of the study was to identify and analyze the daily activities of the technicians in order to determine the routine exposure to loss. The study focused on the routine tasks that are perceived by the technicians as having the highest exposure to accidental loss. This chapter will provide a summary of the study, a sample of major findings, conclusions based on those findings, recommendations based on those conclusions, and recommendations for further research in this area.

Statement of the Problem

The current employee safety program at SSA requires an analysis to determine if the risk exposures encountered by the maintenance technicians are adequately addressed.

Goals

The goals of the study are the following:

- Survey technicians to understand their perspective on the existing safety program and rank what they perceive to be the most dangerous tasks of their daily activities.
- Thoroughly analyze highest ranking tasks using the Job Hazard Analysis (JHA) technique to identify risk exposures experienced by the technicians.
- Develop a standard operating procedure that identifies risk exposures and necessary steps to reduce potential for loss.
- Update the existing Maintenance Technician job description to include the risk exposures that can be expected to be encountered during daily activities.

Methods and Procedures

The technicians completed a survey that requested them to rank a list of routine tasks based on their perception of risk associated with completing those tasks. The ranking values were totaled for each task and then re-ranked in ascending order to determine the tasks with the highest perceived risk. The top five tasks were then analyzed using the Job Hazard Analysis technique to identify the hazards associated with completing the task. Finally, the company's standard operating procedures and maintenance technician job description were analyzed to determine if either document should be updated based on the results of the JHA.

Major Findings

The following section identifies major findings of the study. The findings are based on the data collected from the technicians' survey, performing the JHA, and analysis of the standard operating procedures and job description.

Research Goal #1. Survey the technicians to understand their perspective on the existing safety program and rank what they perceive to be the most dangerous tasks of their daily activities.

- The majority of the technicians feel that they understand the current corporate safety policies and procedures.
- The majority of the technicians feel that the current corporate safety policies and procedures are applicable to their daily routine.
- The technicians' perception of risk varies greatly from one technician to another. Some tasks that were ranked as having the highest perception of risk by some technicians were also ranked as having the lowest perception of risk by others.

Research Goal #2. Thoroughly analyze the highest ranking tasks using the Job Hazard Analysis (JHA) technique to identify risk exposures experienced by the technicians.

- For all five tasks analyzed, the technicians' perception of hazards associated with those tasks is valid.

Research Goal #3. Develop a standard operating procedure that identifies risk exposures and necessary steps to reduce potential for loss.

- The company does not currently use or have standard operating procedures for any of the tasks performed by the technicians.

Research Goal #4. Update the existing Maintenance Technician job description to include the risk exposures that can be expected to be encountered during daily activities.

- The current Maintenance Technician job description does not mention potential hazards to which the technicians may be exposed.

Conclusions

Based on the data collected from the technicians' survey, performing the JHA, and analysis of the standard operating procedures and job description, the following can be concluded about the risk exposures encountered by the maintenance technicians:

Research Goal #1. Survey the technicians to understand their perspective on the existing safety program and rank what they perceive to be the most dangerous tasks of their daily activities.

- The technicians rely heavily on their past experiences and experiences of others to know and understand the hazards associated with the tasks. This explains the individual differences in the perception of risk identified by ranking the tasks.

- The past injuries of the technicians affect the perception of risk for the rest of the technicians as a whole. This is identified in the results of totaling the rankings and then re-ranking the tasks based on the totals. The five tasks with the highest perception of risk as a whole are task in which technicians have been injured in recent years.

Research Goal #2. Thoroughly analyze the highest ranking tasks using the Job Hazard Analysis (JHA) technique to identify risk exposures experienced by the technicians.

- Each of the five tasks analyzed with the JHA identified hazards that have a severity and probability that result in a hazard code of 1. For these hazards, it is imperative for the company to suppress to lower risk levels immediately.
- The technicians do not have proper tools and equipment to complete the tasks safely and efficiently.

Research Goal #3. Develop a standard operating procedure that identifies risk exposures and necessary steps to reduce potential for loss.

- Standard operating procedures and/or guidelines could be written for the tasks that are performed by the technicians. These procedures and guidelines would assist in the control of hazards and eliminate inefficient steps that some technicians may be taking. Also, SOPs can be used as training material for new technicians.

Research Goal #4. Update the existing Maintenance Technician job description to include the risk exposures that can be expected to be encountered during daily activities.

- The current job description does not include any language pertaining to the risk exposures encountered by the technicians. By including this language, the company is taking a step to control the risks early in the process.

Recommendations

The following recommendations are intended to reduce the hazards encountered by the maintenance technicians:

- The technicians currently receive all safety training by computer-based training techniques. The company should incorporate a different training technique such as, hands on or classroom training, along with the computer-based training. Training items such as, proper lifting techniques, lock out / tag out practices and safe driving techniques should be conducted in the field. A different style of training would be more effective and more interesting to the technicians. The computer-based training should still be used as refresher courses throughout the year.
- Currently, the company does not respond to an injury or near-hit with additional training or investigation into the cause of the incident. This appears to be a factor towards the perception of risk among the technicians. The company should incorporate a root cause analysis standard to investigate and determine the exact cause of the incident. Based on the results of the analysis, the company should provide mandatory training for the technicians to reduce the likelihood of the incident occurring in the future. This effort by the company will let the technicians know that the company takes safety seriously and measures are being taken to ensure the technicians can perform their job efficiently and safely.

- The company should develop a train-the-trainer program to develop managers and technicians into better assessors of risk. By providing this training, the field employees will be able to identify hazards and assess the situation more quickly. The company should incorporate the three filter system that is mentioned in Chapter 2. The filter system requires the technician to perform a risk assessment of the situation and by answering three questions, the technician can determine if it is safe and within company guidelines to proceed with the task.
- The hazards identified in the five tasks using the JHA expose the technicians to serious injuries that may result in death. As identified in the JHAs, it is imperative that the company act to reduce the severity and frequency of the steps that have a hazard code of 1. For the majority of the hazards, the technicians are not using the appropriate tools to complete the job. Many of the steps cannot be substituted due to system requirements or regulatory constraints so it is important that the company provides the technicians with the right equipment and tools to safely and efficiently complete the tasks. For example, a better lifting tool that does not require the tech to lift with a jerking motion would reduce the severity of that step in the sump inspection process. Also, during the camera installation, many of the steps were performed with the technician standing on or straddling the very top of the ladder. This would be eliminated if the technicians had the appropriate sized ladder for this task. Finally, providing the technicians with larger barricades to use while working throughout the parking lots will protect the technicians better by making them more noticeable to customers driving.

- The company should continue analyzing tasks with the JHA to better assess the maintenance technician job as a whole. The managers and select technicians should be trained to complete the JHAs and/or assist the corporate safety professionals. This will provide a more detailed listing of the steps involved with the task and the potential for more unknown hazards to be recognized. Also, with the technicians assistance in completing the JHAs they will be directly involved in the development of the program which will result in greater employee compliance. Based on the results of the JHAs, the company can identify what tasks need to be addressed and what needs to be substituted, eliminated or controlled through administrative measures or PPE to reduce the exposure to the hazards. The JHA documents should be reviewed annually to verify that the steps, hazards and recommendations are still applicable.
- The company should develop standard operating procedures and guidelines for tasks completed by the technicians. If the task is required to be completed the same way every time from start to finish, such as changing the filters on the dispenser, then standard operating procedures should be used. If the task does not require the same exact steps every time at every store, such as installing the security cameras, then standard operating guidelines should be used. For both procedures and guidelines, the hazards associated with the task, safety precautions that should be taken, and emergency procedures should be included in the documents. The JHAs should be used by the company to develop the standards because the steps, hazards and safety precautions are already documented. These documents should be reviewed and updated yearly by maintenance personnel to ensure all steps are still applicable. These documents should also be used as training for new technicians.

- The company should update the current maintenance technician job description to include the potential hazards to which the technician may be exposed. This is the company's first opportunity to inform and educate the potential employee on the conditions of the job. This provides the company an opportunity to identify how the employee may respond to the hazards in the field. Hiring employees that are able to assess hazards and are safety conscious reduces the company's exposure to loss.

Areas of Further Study

- Expand the number of surveys completed to other areas of the company to get a greater understanding of the overall perception of risk among the company's technicians.
- Include a wider selection of tasks and associated hazards when surveying the technicians to ensure the tasks with the highest perception of risk are identified.
- Include a learning assessment survey to understand how the technicians would best understand and retain training material.

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Appendix A

Maintenance Tech Risk Exposure Survey

1. How well do you understand the current Corporate Safety policies and procedures?

    a) Understand completely
    b) Sort of understand
    c) Do not understand
    d) Did not know there were any

2. Do you feel that the current Corporate Safety policies and procedures are applicable to your daily routine?

    a) Completely applicable
    b) Somewhat applicable
    c) Not applicable at all
    d) Did not know there were any

3. Please rank the activities below based on what you perceive to be the most dangerous: (1 = most, 12 = least)

    _____ Changing product filters on dispensers (chemical hazard)
    _____ Changing hanging hardware on dispensers (chemical hazard)
    _____ Changing hanging hardware on dispensers (customer vehicle hazard)
    _____ Working on security cameras (ladder use)
    _____ Working on submersibles (customer vehicle hazard)
    _____ Working on submersibles (electrical hazard)
    _____ Working on UST system (fire hazard)
    _____ Driving to sites to perform work (driving hazards)
    _____ Working on food service equipment (electrical hazard)
    _____ Sump inspections (heavy lifting hazard)
    _____ Working on food service equipment (heavy lifting hazard)
    _____ Changing lights (ladder use)

If an activity you feel is dangerous is not listed above, please add it below:

_____

Appendix B - 1

Job Hazard Analysis (JHA) Form
Task Analysis Section

Date Performed: _____ **Time Performed:** _____

Technician Performing Task: _____

Reviewer: _____

Description of Task: _____

Priority Ranking (circle one): Critical Rush Emergency Routine Project

System Number: _____

Analysis (circle one): Initial Revision Addition

Task Analysis:

Appendix B - 2

Job Hazard Analysis (JHA) Form

Hazard Analysis Section

Date Performed: _____ **Time Performed:** _____

Technician Performing Task: _____ **Reviewer:** _____

Description of Task: _____

System Number: _____

Analysis (circle one): Initial Revision Addition

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:

Appendix B - 3

Hazard Codes	
Struck-By – an injury in which a person is struck by an object of some kind.	SB
Struck-Against – one in which the worker unexpectedly and forcefully makes contact with something in the worker's environment.	SA
Caught-Between – pinch point hazards.	CB
Contact With – involve someone making contact with something hot, a chemical, or electricity.	CW
Contacted By – worker is somehow forced by other means into contact with the object. Injury must be caused by the injurious characteristics of the contacting agent and not the force of the contact.	Cby
Caught On – worker having a part of his clothing, working attire, or body caught on a moving or stationary object.	CO
Caught-In – involves the person or a part of the person's body being caught in an enclosure or hole of some kind.	CI
Fall Same Level – falls that occur at the walking level or on stairs and steps.	FS
Fall to Below – at least one person falls from one level where they have been working, standing, or walking to a lower level.	FB
Overexertion – incident or injury is one in which a worker is injured by putting too much strain on some part of the body, or his body is used improperly to complete a task.	OE
Environmental Exposures – exposures involve radiation, fumes, gases, vapors, mists, dusts, temperature extremes, oxygen deficiencies, and noise.	EE

Appendix B - 4

Severity Of Accidental Loss					
Category	Personnel Injury Illness	Equipment Damage / Loss	Process Downtime	Product Loss	Environmental Effect Loss
I Catastrophic	Death	>$250,000	> 1 Week	>$50,000	>$250,000
II Critical	Injury Illness Loss >$50,000	$50,000 – $249,999	4 Days – 1 Week	$10,000 – $50,000	$50,000 – $249,999
III Marginal	Injury Illness Loss $5,0000 – $49,999	$5,000 – $49,999	2 Days – 3 Days	$1,000 – $10,000	$5,000 – $49,999
IV Negligible	<$5,000	<$5,000	<1 Day	<$1,000	<$5,000

Frequency Of Accidental Loss						
Level	A	B	C	D	E	F
Descriptive Term	Frequent	Probable	Occasional	Remote	Improbable	Impossible
Definition	Likely several times a year	1-2 Year Event	3- 5 Year Event	6-20 Year Event	21-100 Year Event	>101 Year Event

Appendix B – 4 continued

Risk Matrix

	Frequency					
Severity	Impossible	Improbably	Remote	Occasional	Probable	Frequent
I Catastrophic					1	
II Critical				2		
III Marginal			3			
IV Neglible						

Risk Code/Actions:

1	Imperative to suppress risk to lower levels
2	Task needs supervisor approval before proceeding
3	Task completion permissible

Appendix C

Job Hazard Analysis (JHA) Form
Task Analysis Section

Date Performed: 11/17/2009 **Time Performed: 11:30 a.m.**

Technician Performing Task: Tom

Reviewer: Jon Hostasa

Description of Task: Maintenance on 1.5 h.p. submersible turbine motor

Priority Ranking (circle one): Critical [Rush] Emergency Routine Project

System Number: SM - 1

Analysis (circle one): [Initial] Revision Addition

Task Analysis:

1. Tech barricades work area with maintenance vehicle and three 24 inch cones.
2. Discuss with store employees the work that is being completed.
3. Tech dons PPE – reflective vest and gloves
4. Tech places "Out of Order" labels on appropriate grade of gas on the dispensers while motor is shut down.
5. Tech turns electrical breaker for motor to "off"
6. Tech removes 36" steel manhole lid with 24" hook tool.
7. Tech visually verifies that no petroleum is in the sump.
8. Tech assembles required tools and enters 36" deep sump.
9. Tech enters the sump and disconnects electrical yoke on motor to ensure no power to motor. The power is eliminated to the yoke on the motor as long as breaker remains "off"
10. Tech makes appropriate repairs to the motor.
11. Tech reconnects electrical yoke on motor to supply power to the motor.
12. Tech turns electrical breaker for motor to "on".
13. Tech test the repairs by activating the motor by turning on the appropriate grade at the dispenser.
14. Upon approval of repairs, the tech replaces the manhole lid and cleans up the work area.

Appendix C continued

Job Hazard Analysis (JHA) Form

Hazard Analysis Section

Date Performed: 11/17/2009 **Time Performed: 11:30 a.m.**

Technician Performing Task: Tom **Reviewer: Jon Hostasa**

Description of Task: Maintenance on 1.5 h.p. submersible turbine motor

System Number: SM - 1

Analysis (circle one): Initial Revision Addition

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:
1. Tech barricades work area with maintenance vehicle and three 24 inch cones.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. If the tech can use a store employees vehicle to help barricade the other side of the sump that would be ideal.
5. Tech turns electrical breaker for motor to "off"	CW	I	Probable	1	The tech should use company approved lock out / tag out methods to ensure energy to motor is completely disabled and cannot be turned on by anyone else.
6. Tech removes 36" steel manhole lid with 24" hook tool.	OE	III	Frequent	2	The tech should use proper lifting methods and refrain from "jerking" on the lid as a removal technique. The use of additional tools to create a fulcrum system should be used to reduce stress on the back.
9. Tech enters the sump and disconnects electrical yoke on motor.	CW	I	Probable	1	The tech should use an LEL meter to verify that the levels of hazardous vapors in the sump are acceptable prior to entering the sump.

Appendix D

Job Hazard Analysis (JHA) Form
Task Analysis Section

Date Performed: 11/18/2009 **Time Performed: 11:30 a.m.**

Technician Performing Task: Dave

Reviewer: Jon Hostasa

Description of Task: Underground storage tank and dispenser sump inspection

Priority Ranking (circle one): Critical Rush Emergency [Routine] Project

System Number: SI - 1

Analysis (circle one): [Initial] Revision Addition

Task Analysis:

1. Tech dons reflective vest.
2. Tech places one 24 inch safety cone next to manhole to be inspected.
3. Tech uses lifting tool with hook to remove 36" steel manhole lid.
   Manhole lid weighs approximately 200 lbs. and is moved by lifting approximately one half inch and slid over.
4. Tech uses lifting tool with hook to remove sump containment lid.
   Sump lid is plastic and fits tightly over sump to maintain a water tight seal.
   Lid is removed by the tech lifting straight up from standing position - to remove the tech uses numerous jerking movements to release the seal.
5. Tech bends down to inspect sump for water and damage.
6. Tech replaces sump lid and manhole lid.
7. Tech relocates cone and repeats the steps on remaining sumps.
   At this site the tech inspects 3 sumps by repeating the above steps.
8. Tech relocates cone to dispensers to perform dispenser sump inspection.
9. Tech opens dispenser door with a key and inspects for water and damage.

Appendix D continued

Job Hazard Analysis (JHA) Form
Hazard Analysis Section

Date Performed: 11/18/2009 **Time Performed: 11:30 a.m.**

Technician Performing Task: Dave **Reviewer: Jon Hostasa**

Description of Task: Underground storage tank and dispenser sump inspection

System Number: SI - 1

Analysis (circle one): [Initial] **Revision Addition**

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:
2. Tech places one 24 inch safety cone next to manhole to be inspected.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. If the tech can use a store employees vehicle to help barricade the other side of the sump that would be ideal.
3. Tech uses lifting tool with hook to remove 36" steel manhole lid.	OE	II	Frequent	1	The tech should use proper lifting methods and refrain from "jerking" on the lid as a removal technique. The use of additional tools to create a fulcrum system should be used to reduce stress on the back.
4. Tech uses lifting tool with hook to remove sump containment lid.	OE	II	Frequent	1	The tech should use proper lifting methods and refrain from "jerking" on the lid as a removal technique. The use of additional tools to create a fulcrum system should be used to reduce stress on the back.
8. Tech relocates cone to dispensers to perform dispenser sump inspection.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. The use of the tech's truck as a barricade would be ideal.

Appendix E

Job Hazard Analysis (JHA) Form
Task Analysis Section

Date Performed: 11/17/2009 **Time Performed: 2:00 p.m.**

Technician Performing Task: Jim

Reviewer: Jon Hostasa

Description of Task: Changing of fuel filter on a dispenser

Priority Ranking (circle one): Critical [Rush]
Emergency Routine Project

System Number: FF - 1

Analysis (circle one):
[Initial] **Revision**
Addition

Task Analysis:

1. Tech dons reflective vest and grabs one 24 inch cone.
2. Tech chooses a dispenser without any customers and places cone in front of dispenser.
3. Tech removes dispenser door with key and sets it to the side.
4. Tech uses wrench to engage impact valve
   Impact valve restricts the flow of gasoline into the filter.
5. Tech places metal tray under the filter that will be removed in order to collect any gasoline.
6. Tech uses filter wrench to slowly unthread filter
   Slowly removing filter allows pressure to bleed off.
7. Once pressure is gone, the tech completely removes the filter.
8. The filter is drained in the tray.
9. Tech installs new filter using filter wrench.
10. Tech uses wrench to open impact valve.
    This allows the flow of gasoline back into the filter.
11. Tech activates dispenser and pumps 1 gallon into an approved container.
    The tech inspects the filter for any leaks.
12. The tech closes up the dispenser.
13. Tech takes approved container over to the underground storage tank and pours the gasoline back into the tank.
14. Tech continues to another dispenser and repeats the above steps.

Appendix E continued

Job Hazard Analysis (JHA) Form
Hazard Analysis Section

Date Performed: 11/17/2009 **Time Performed: 2:00 p.m.**

Technician Performing Task: Jim **Reviewer: Jon Hostasa**

Description of Task: Changing of fuel filter on a dispenser

System Number: FF - 1

Analysis (circle one): [Initial] **Revision Addition**

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:
2. Tech chooses a dispenser without any customers and places cone in front of dispenser.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. The use of the tech's truck as a barricade would be ideal.
6. Tech uses filter wrench to slowly unthread filter	CW	II	Frequent	1	The tech should don a face shield and protective gloves to ensure that gasoline does not come in contact with their eyes or skin.
13. Tech takes approved container over to the underground storage tank and pours the gasoline back into the tank.	SB	I	Probable	1	The tech should use additional larger barricades with flashing lights to protect the work area. The cones are not large enough for customers to see while driving. The use of the tech's truck as a barricade would be ideal.
5. Tech places metal tray under the filter that will be removed in order to collect any gasoline.	CO	IV	Frequent	3	The tech should wear gloves that cover up their elbows or long sleeve apparel to protect their arms from sharp edges.

Appendix F

Job Hazard Analysis (JHA) Form
Task Analysis Section

Date Performed: 11/20/2009 **Time Performed: 11:30 a.m.**

Technician Performing Task: Dave

Reviewer: Jon Hostasa

Description of Task: Running of camera wire through ceiling from office to backroom

Priority Ranking (circle one): Critical Rush Emergency Routine Project

System Number: SC - 1

Analysis (circle one): Initial Revision Addition

Task Analysis:

1. Technician identifies the path the security camera wire will travel to get from office to backroom .
2. Tech grabs 6 foot ladder and sets it up near back room to remove ceiling tile.
3. Ceiling in backroom is approximately 11 feet high.
4. Tech stands on 1st and 2nd rung from the top of ladder to look into ceiling.
5. Store employees continually walk past ladder to retrieve items from storage.
   Approximately 1 foot of space on each side of ladder for employees to pass
6. Tech straddles top of ladder - one foot on 2nd rung of ladder and the other foot on the brace of ladder.
7. Tech feeds wire into ceiling.
8. Tech relocates ladder to continue feeding wire through ceiling.
9. Tech stands on top level of ladder to remove drop ceiling tile and continue to pull wire.
10. Tech relocates ladder to continue feeding wire through ceiling.
11. The ceiling in this location is now 8 feet high so the tech sits on the top level of the ladder to continue working.
12. Tech relocates ladder to the sales floor to continue feeding wire through ceiling.
13. Tech straddles ladder and stands on top rung to reach wire in ceiling.
14. Ceiling is approximately 8 feet high in this location.
15. Customers walk around ladder to get to restrooms.
16. Approximately 2 feet of space on each side of ladder for customers to walk around.
17. Tech relocates ladder to office to continue feeding wire.
18. The ceiling is approximately 11 feet high in the office.
19. Tech stands on top level of ladder to grab wire and pull through ceiling tile.
20. Tech pulls wire to desired location.

Appendix F continued

Job Hazard Analysis (JHA) Form

Hazard Analysis Section

Date Performed: 11/20/2009 **Time Performed: 11:30 a.m.**

Technician Performing Task: Dave **Reviewer: Jon Hostasa**

Description of Task: Running of camera wire through ceiling from office to backroom

System Number: SC - 1

Analysis (circle one): Initial
Revision Addition

Description of Step:	Hazard Code	Severity	Frequency	Risk Code	Recommendations:
4, 6, 9, 11, 13, 19. Tech stands on 1st and 2nd rung from the top of ladder to perform work	FB	II	Probable	1	The tech should use the appropriate equipment for the job. The tech needed an 8 feet and 10 feet ladder in order to reach the heights required.
5. Store employees continually walk past ladder to retrieve items from storage.	SB	II	Probable	1	The tech should discuss with the store employees that the area around the ladder is inaccessible and the employees should retrieve any items they may need prior to setting up the ladder.
15. Customers walk around ladder to get to restrooms.	SB	II	Probable	1	The tech should barricade off the area in which work is being completed to ensure customers cannot strike the ladder.

Appendix G

Maintenance Technician Job Description

2009 Compensation Policy

Compensation Table of Contents / Job Responsibility Statement Table of Contents

CORPORATE **Effective Date: 10/27/02**

RESPONSIBILITY STATEMENT

Position: Maintenance Technician, Associate
Maintenance Technician
Maintenance Technician, Advanced
Maintenance Technician, Lead

Reports to: Maintenance Supervisor **Subgroup:** U0 Hourly FT
Subarea: 2106 Hourly Mnt. Tech.

Responsibilities:

I. **Legal / Administrative**

1. Meets current DOT medical certification standards.
2. Possesses a valid motor vehicle operator's license of the type and class required for the type of vehicle(s) driven.
3. Complies with all applicable state and federal DOT rules and regulations concerning the operation of assigned motor vehicle(s), including keeping and maintaining driver's logs.

II. **Equipment Maintenance Tasks**

1. Schedules and prioritizes duties and work assignments.
2. Observes and inspects equipment to determine if servicing is required.
3. Completes preventative and basic maintenance tasks on dispensers, consoles, heating and refrigeration equipment, lighting, signs, pumps, and other station equipment as required. These tasks require lifting equipment and access covers weighing in excess of 125 lbs.; climbing ladders to roofs, ceilings, and signs and descending into access pits up to 6 feet deep; crawling into access areas and under counters and dispensers; and assembling and disassembling large and small mechanical, plumbing, and electrical parts, assemblies, and components.
4. Reads, interprets, and follows procedures described in service manuals.
5. Calibrates pumps and dispensers in accordance with legal standards.
6. Keeps assigned company vehicle(s) in a safe and orderly condition, which includes scheduling maintenance as required, and securing, organizing, and safeguarding company equipment contained in and on the vehicle.
7. Recommends when an outside contractor is required to handle a maintenance problem.
8. Assists in the correction of other maintenance problems as directed by the Maintenance Supervisor.
9. Tests tanks and assists in investigating suspected leaks as required.
10. Works on outside equipment as required, regardless of weather conditions.

III. **Special Duties and Responsibilities.**

1. Available 24 hours per day, 7 days per week on an on-call emergency basis, in addition to a normal work schedule.
2. Attends training classes (both in and out of the local area) as required to learn maintenance procedures for specific equipment.

Effective 1/1/08
Revised 1/09